

Findings

Holding One's Breath During Radiation Can Protect the Heart

Jefferson researchers have discovered a simple technique that may be most effective in preventing heart disease after radiation therapy for breast cancer.

Women who have breast cancer on their left side present a particular challenge to radiation oncologists. Studies have shown that the risk of heart disease is higher in this group of women after radiation treatment because it can be difficult to ensure that a sufficient dose of radiation is delivered to the left breast while adequately shielding the heart from exposure. The new research shows a woman who holds her breath during radiation pulses can greatly reduce radiation exposure to the heart.

"Radiation therapy is commonly prescribed to patients with breast cancer following surgery as a component of first-line therapy," said first author Harriet Eldredge-Hindy, MD, chief resident and researcher in Jefferson's Department of Radiation Oncology.

"We wanted to determine how effective breath-hold could be in shielding the heart from extraneous radiation exposure during treatment of the left breast."

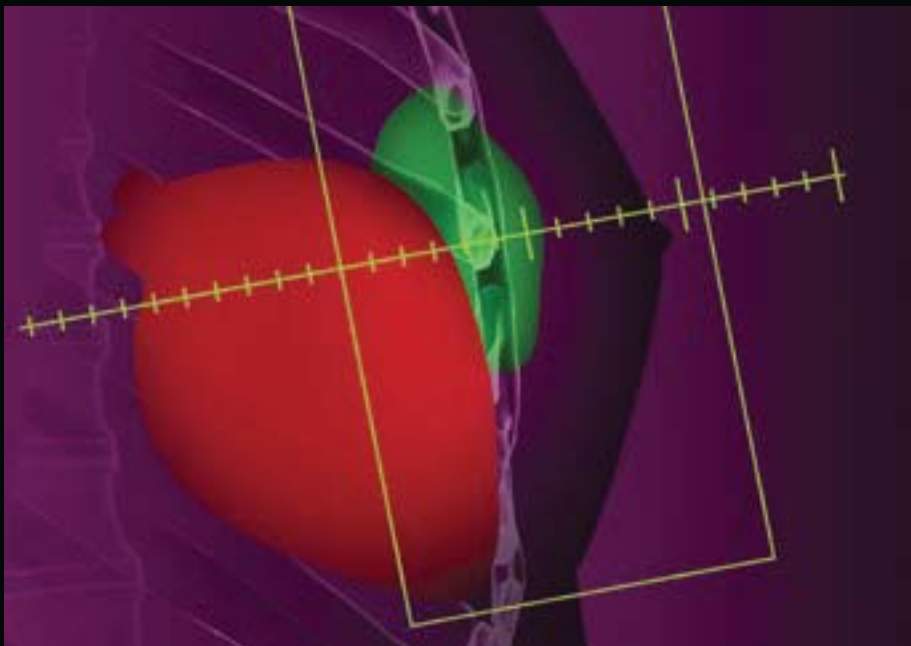
A number of techniques have been developed to reduce exposure to the heart including prone positioning (lying flat on the belly on a bed that only exposes the left breast), intensity-modulated radiation therapy and accelerated partial-breast irradiation. The breath-hold technique allows doctors to monitor a patient's breath for the position that shifts the heart out of the range of the radiation beam.

In the largest prospective study to date, following women for eight years post treatment, 81 women were asked to hold their breath during radiation treatment for breast cancer — a process that was repeated until therapeutic dose was reached. The researchers found that patients capable of holding their breath over the course of treatment had a 90

percent disease-free survival and a 96 percent overall survival, with a median reduction in radiation dose to the heart of 62 percent. The findings were published in January 2015 in the online journal *Practical Radiation Oncology*.

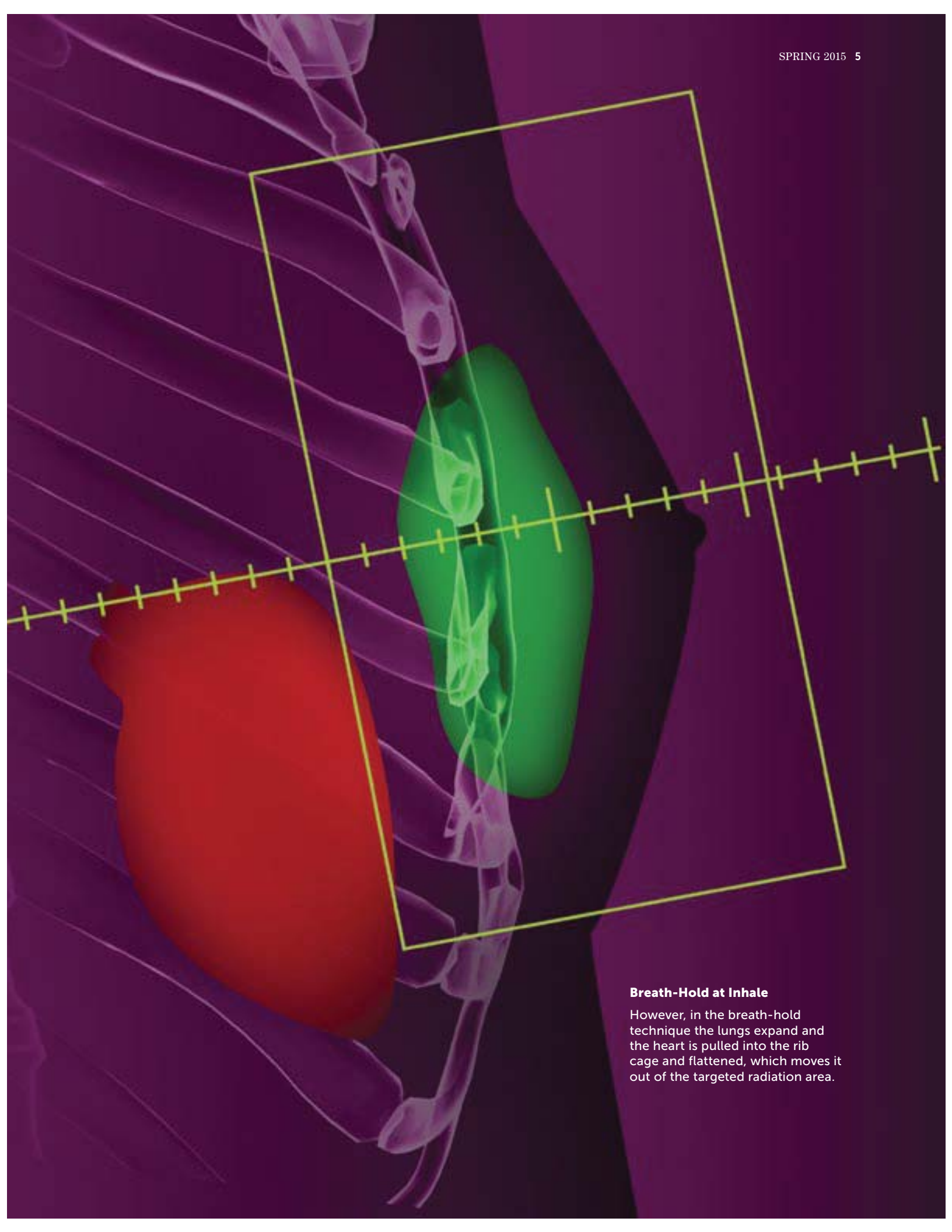
"Given that this technique helps to shield the heart during radiation treatment for breast cancer," said Rani Anne, MD, associate professor of radiation oncology and senior author of the study, "we routinely offer breast cancer treatment with the breath-hold technique at Jefferson."

To support breast cancer research at Jefferson, contact Paul Gunther, Director of Development, Sidney Kimmel Cancer Center, at 215-955-9446 or paul.gunther@jefferson.edu.



Free-Breathing

In this illustration the free-breathing method results in the heart being within the targeted radiation area.



Breath-Hold at Inhale

However, in the breath-hold technique the lungs expand and the heart is pulled into the rib cage and flattened, which moves it out of the targeted radiation area.